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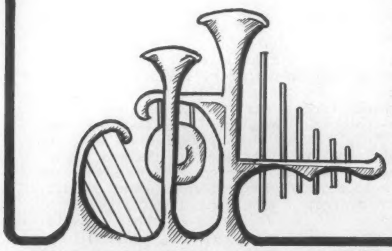

EXPERIMENTAL MUSICAL INSTRUMENTS

FOR THE DESIGN, CONSTRUCTION AND ENJOYMENT OF NEW SOUND SOURCES

THIS TIME AROUND

Welcome to **Experimental Musical Instruments** #3. My recomendation for news item of the month: "Ripley's Believe It Or Not" TV show presents Marie Osmond playing soundworks by Bill and Mary Buchen. The Buchens are the creators of instruments like Flying Beaver-Turtle Shell Rattles, sonic pinball and various things using skeleton parts. Can you picture it? Their letter is on page 3.

Recently I have been thinking about the relationship between new instruments and musical style. A high proportion of new instruments are designed with non-traditional music in mind. Some do not produce readily-controlled pitches, or produce scales other than 12-tone equal temperament. Some do not lend themselves to precise, prescribable rhythmic articulation. Much of the music one hears being played on them either de-emphasizes traditional organizing elements (melody, harmony, meter, rhythm, form...) or uses them in unfamiliar ways.

It seems reasonable: unconventional instruments go with unconventional music. But it needn't necessarily work that way. One can perfectly well create new instruments to play "When the Saints Go Marching In," or "Melancholy Baby." In fact, music using some familiar and accessible formal elements, but which is fresh and intriguing in timbre and texture, can be very effective.

So we have two orientations for new instruments, though they need not be mutually exclusive. Instrument designers can look to new sounds unconstrained by standard musical practice, or they can seek fresh timbres for the musical languages already available to us. In the pages of **Experimental Musical Instruments** it would be easy to allow avant-garde instruments to eclipse traditionally-oriented ones, because avant-garde instruments are somehow more talk-aboutable. But it is our policy not to lean too much to one way of thinking or the other. The balance may shift from one issue to the next, but all new instruments have a place here.

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Below left: The Puget Sound Wind Harp, article on page 4. (Drawing from a photo by Terry Domico.)

IN THIS ISSUE

We are enjoying your first issue, and we hope you expand and continue all things, particularly the section on Organizations and Periodicals. This will make a valuable reference file. Here at the Museum, we are doing a great many referrals, offering addresses where people can write for help on their pet project. I often think we are just a sort of information desk.

In line with this you might want to include our Reed Organ Society which now issues a quarterly of more than 30 pages and is still growing. We are working mainly in the field of parlor pump organs. I will include a back issue.

I am also including a copy of our tour guide. While many of the things in our museum were not really "experimental" they were experiments in a way. Maybe they would sell and maybe not! Many of them didn't make it.

Arthur H. Sanders
The Musical Museum
Deansboro, NY 13328

Editor's note: The Musical Museum is a hands-on museum of musical instruments, with an emphasis on early mechanical instruments. They have some wonderful specimens on display. It's easy to forget that before record players became universally available, people created some extraordanarily ingenious and imaginative mechanical musical devices.

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Thanks for sending the first two issues of EMI. You & friends are finding a lot of very interesting material and are doing it up very well.

Lou Harrison's penchant for making his own instruments and using "found" objects for musical sounds helped to draw me to him when we met in 1967. Soon after moving in with him in Aptos I was tuning up pieces of EMT (electrical metallic tubing) I'd been so familiar with, having been an electrician for over thirty years. Lou's a stickler for proper intonation and it soon became clear that more than the ear was needed to get the exact just ratios he wanted. Having worked with an oscilloscope in my Aircraft Working group in the army in Alaska in 1942 I knew that that would do the trick so I went to Zack's on Market Street, resulting in my coming home with a carton. I told Lou "Here's the 'scope I mentioned" and emptied the contents on the bed -- tubes, condensers, resistors, wires, sockets, etc. -- a Heathkit! (I remember that the kit was $60 -- you could buy it assembled for $90.) Well, we soldered away for a few hours and it's worked fine ever since. (It's been a spare for the last few years -- I found a large WW II Dumont in a flea market in San Jose -- only $35. Dan Schmidt used it for a while.) The oscilloscope works so well for what we do -- Gamelans mostly -- that I've never thought of using anything else. I was amazed to note that it wasn't mentioned in the article about tuning in issue #1. I suppose all those gadgets do work OK.

Bill Colvig

Editor's note: The article on tuning devices failed to mention both oscilloscopes and monochords. The devices the article did discuss -- tuning forks, strobe tuners, electronic meter-readout tuners and the like -- tune absolutely rather than relatively, with an orientation to established pitches of known frequency. Most are designed with a bias to twelve-tone equal temperament (which usually can be overcome, with some inconvenience, by reference to a frequency-to-cents chart). Oscilloscopes and monochords, by their nature, lend themselves more readily to relative tuning, and accordingly to just intervals and rational intonation systems (systems based on ratios of frequencies). A follow-up article to fill the gap in the earlier one is in the works.

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EXPERIMENTAL MUSICAL INSTRUMENTS
A Newsletter for the Design, Construction and Enjoyment of New Sound Sources

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SUBMISSIONS: We welcome submissions of articles relating to new instruments. Articles about one's own work are especially appropriate. A query letter or phone call are suggested before sending articles. Include a return envelope with submissions.

The article on the Candlestick Festival is terrific, thanks for coming and covering the event in your excellent periodical... also, look forward to Tom Nunn"s upcoming article. We especially enjoyed the article on Ellen Fullman in this issue and discovered she's a fellow Minnesotan in the field.

It's good to see articles that are factual, solid, and lack a 'new age' perspective. It's nice to get the scientific background behind acoustic materials and techniques and we can each dream for ourselves about the wonderful possibilities. Typesetting and justification was good to see. Only suggestion would be more contemporary graphics (although we do like the wind harp logo on the back).

If you're interested in covering some sound artists involved in 'industrial' instrumentation and noises, we might suggest Remko Scha... uses strings activated by saber saws to play guitars..., Skip La Plante, builds and plays instruments made from trash... or Bow Gamelan Ensemble who recently performed here [NYC]... they build sculptural instruments from junkyard materials mostly and play many of them with blow torches.

We're staying in this steamy city for the summer... learning how to be better arts administrators with our computer... writing grants... working on funding for the S.F. sound park at Candlestick. We performed a concert series here at the end of June, and a couple of weeks ago, Ripley's Believe It Or Not came here to shoot Marie Osmond playing some of our works... it is a little hard to believe... we'll be building a wind harp in Staten Island this fall and will take our pinball game to New Music America in LA in November and miniature golf to Houston next April.

Bill & Mary Buchen

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COMING UP

Here are some of the articles scheduled for the next issue of Experimental Musical Instruments.

"Musical Instrument Classification Systems" -- a discussion of the various approaches to the categorization of musical instruments and an overview of the widely-used Sachs-Hornbostel system.

"The Bi-level Guitar" -- a radical departure in soundboard design that has produced instruments with volume and brilliance far surpassing that of conventional instruments (sounds like overstatement, but it's true). Written by David Marriott.

"Holy Crustacean, Batman, That Beast Sings" -- the second of Tom Nunn's articles on his instruments. This one looks at the space plate family of instruments, which are (in Nunn's words) "balloon-mounted rodded metal sound radiators."

"Slit Drums and Boos and the Problem of Destructive Communication" -- a discussion of possible new designs based on slit drums, and a look at a recurring acoustic problem in instrument design.

"Disorderly Tumbling Forth" -- description of an idiophonic keyboard instrument designed and built by Bart Hopkin.

NEW INSTRUMENTS SOUGHT FOR FEATURE FILM SCORE

Unifilms, a film company based in Hollywood, is seeking new sound sources around which to build the score for a forthcoming film. The film is to be a feature-length movie, appealing to a broad audience and going head-to-head with the leading box office draws of the season. The plot is in the realm of fantasy -- the story of a newly-wed husband who must complete certain tasks in his effort to recover his abducted wife. It uses live action (as opposed to animation), with moderate use of special effects, comparable to the currently-showing Cocoon.

Unifilms is producing the film independently, though at this point it remains open to investors or production partners. They intend to distribute it through one of the major distributors, and Warner Brothers has expressed interest.

The producers and directors have not yet decided whether the instruments used in the score will appear on the screen. The feeling seems to be that the visual effect of the instruments, handled sensitively, could be most enhancing; on the other hand, it might be difficult to integrate them convincingly.

Composition of the score awaits selection of the instruments. If it seems appropriate, the producers may look to improvisations by those who know the instruments best rather than a formally composed score.

The producers of the film are interested in hearing from instrument builders with instruments that could potentially be used. Jack Adams of Unifilms writes, "We would be interested in previewing recordings to determine if the sounds would fit into the scope of the film. These tapes or LPs would not have to be of studio quality or commercial packaging; we merely want to get a rough idea of what the sounds or instruments sound like.

"It would also be helpful to have photographs or illustrations of the instruments. We would be happy to return these to the sender, if return postage and a return mailing container are included.

"We feel this is a wonderful opportunity for musicians and sound people to be recognized. Please let us know if you or someone you know can help us in our search."

Tapes and photographs may be sent to:

Jack Adams
Unifilms
6748 Clybourn Ave.
North Hollywood, CA 91606

INSTRUMENTS

THE PUGET SOUND WIND HARP

Designed by Ron Konzak
Built by Ron Konzak and friends

A word of polite caution to anyone wanting to see and hear the Puget Sound Wind Harp: it stands on privately owned property, and while the owners have been generous in giving people access, their rights and privacy should be respected.

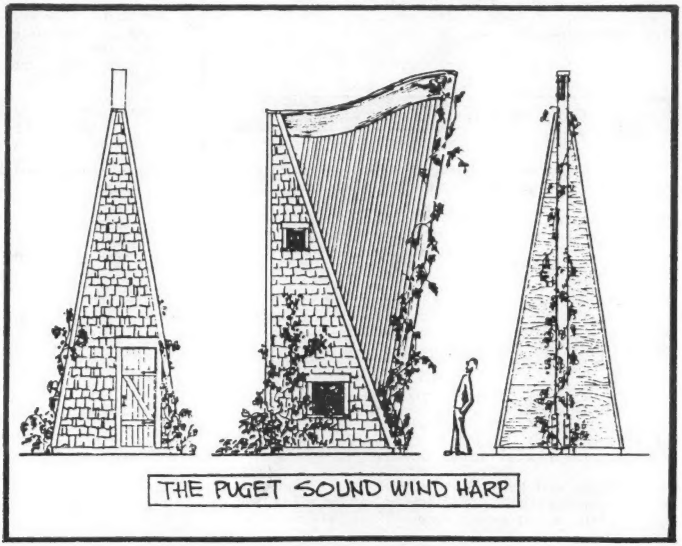
On a windy bluff overlooking Puget Sound on Bainbridge Island stands the giant Puget Sound Wind Harp. You can see it from half a mile and more away, standing against the sky, the shape very much like that of a traditional folk harp. Those who find their way out to its point of land can pause to hear it sing in the wind. They can watch the standing waves as they appear and disappear in the long steel bands that serve for strings, and they can lean against the huge soundboard to feel the music. There is a door at the base of the structure that visitors can step through to stand inside the resonating chamber. From there a ladder takes them to a tiny, windowed room in the upper part of the chamber to look out over the bluff, hearing the voice of the harp all the while.

The Puget Sound Wind Harp was built by Ron Konzak, a builder and player of Celtic harps and singer of Irish and Scottish ballads. He chose this location for his giant harp because it had the wind, it seemed right visually, and it was accessible to the people of the local community. Community is an important facet of the project. Lots of friends and neighbors helped build the harp, and lots of friends, neighbors and strangers will enjoy it. Because the performer -- the wind -- stands outside the social sphere and touches everyone equally, some of the us-and-them barriers that can appear in music performance, some of the problems of ego and the elitism of virtuosity, will not arise. It is a situation conducive to communal enjoyment, at the same time rewarding in solitude.

CONSTRUCTION AND DESIGN

The design requirements for a large wind harp are exceptional. Its massiveness calls for construction materials and methods foreign to most instrument building. It must be capable of withstanding extreme winds, and strong enough to take the stress of the long, heavy strings under tension. It must be completely weatherproof. To meet these demands Konzak used his background as an architectural designer. He also enlisted the help of a structural engineer, Ed Hagemann.

The instrument sits on a two-ton concrete foundation. The resonating chamber is a narrow four-sided pyramid, twenty-feet high with a base of eight feet square. One side is perpendicular to the ground, with the others sloping to it. The structure uses 2X4 framework construction covered with heavy plywood and finished with wood shingles. There is a door in the vertical back wall, and windows in the sides at the first and second floor levels. The soundboard, forming one of the walls of the chamber, is plywood with a waterproofing finish. The crosspiece is a six-by-sixteen-inch laminated wood beam, and the pillar



THE PUGET SOUND WIND HARP

Drawing by Ron Konzak

is a douglas fir log. There are thirty strings, the longest of which is nineteen and a half feet. They are attached by to the beam and the soundboard by means of eye bolts, with turnbuckles at the soundboard end for tuning.

Konzak began work on the harp in the first months of 1984. One sunny day in September of the same year, in an atmosphere of community carnival, Konzak and friends raised the beam to complete the basic structure. With the strings attached shortly thereafter and the first breezes of autumn coming up, it first sounded on October 26th.

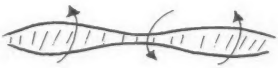
Konzak strung it initially with steel cable of various gauges. The results were disappointing, and for a period of time Konzak feared that his vision for the harp would not be fully realized. But, reasoning that a string with more surface area to catch the wind might be more effective, he ordered some stainless steel banding, 3/8ths of an inch wide by 2/1000ths thick, and restrung the harp. With the next breezy day he found his reasoning had worked. The harp sang readily and with generous volume.

THE SOUND

The harp produces full, sustained tones, very strong in the lower frequencies. They rise and fall slowly, with gradually occurring changes as to which strings are sounding and which overtones dominate at a given moment. The flat bands respond easily to shifts in wind direction and velocity. The sound within the chamber is quite loud, and sitting in the loft there, one can't help but gain a new sense of the personality of the wind as it plays of the strings with, in Konzak's words, "drama, capriciousness and humor". The peculiar feature of the outsize instrument is, of course, that the fundamental tones of the strings are subsonic. The listener hears only overtones, often in dense clusters with no single clear pitch dominating.

It is my impression from speaking to Konzak and listening to recordings that the steel bands behave in a manner similar to conventional round strings as regards nodes, loops and harmonics. As I conceptualize their motion it seems likely that they would do so, with the exception that their shape might restrict their direction of movement to a single plane, while round strings are free to vibrate in all directions. On this subject Donald Hall, professor of acoustics at Sacramento State University and a member of the editorial board of this newsletter, remarks, "Along with purely transverse motion

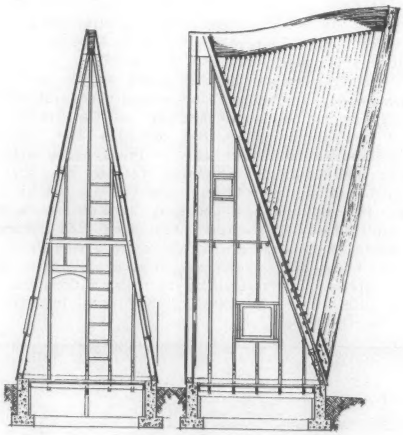
I would expect torsional waves



to be equally prominent, maybe even more so, in such a flat ribbon." (The vibrating systems of irregularly-shaped strings is an interesting topic -- one wonders if there are other people currently working with or studying strings that are not round in cross section.)

Many aeolian harps have strings of the same length deliberately tuned to the same pitch, the idea being that this will create a coherent and pleasing relationship between the overtones that sound at different times. But on the Puget Sound Wind Harp the strings are not the same length. Other factors prevent this simple approach to tuning as well. It makes sense to tune a string on the basis of its fundamental, since the fundamental determines the pitches that the string will produce. But tuning notes which cannot be heard, as with the giant wind harp's subsonic fundamentals, is an awkward proposition. There are means by which one could ascertain the fundamentals, and then work out how to tune them to create desirable relationships between the overtones. But this is a situation in which experimentation is likely to be more valuable than theory. It is difficult to predict the behavior of strings of this length, shape, mass and rigidity subjected to the variable stimulus of wind currents. And the mass of overtones that the instrument produces is sufficiently dense to bring into question the practical value, the "hearability" in practice, of any tuning theory. Furthermore, the aesthetic of the instrument calls for the acceptance of some fortuitous randomness. In other words, the most effective way to tune the instrument is to adjust the turnbuckles and listen, adjust and listen again, until one hears something one likes, having learned something about the strings' behavior in the process.

THE FRAMING FOR THE WIND HARP



The wind harp communicates the wind's music as much by sight and feel as by sound. Not only can one see the strings vibrating; one can actually see individual overtones within the vibration: nodes and loops are clearly recognizable as they appear and disappear within the evolving vibration pattern. Vibrations from the subsonic on up can also be felt in the massive soundboard by resting one's entire body up against its sloping surface.

The Puget Sound Wind Harp has been recorded. The cassette, **Harps in the Wind**, is available from Acme Music and Stormdoor Company, Box 4494, Rolling Bay, WA 98061, for $11 ($10 + $1 postage and handling). One side of the tape contains thirty minutes of the giant wind harp recorded in stereo; the other contains the sounds of one of Konzak's Celtic harps strung with nylon also singing in the wind. It was the aeolean singing of this small harp, heard by chance one day, that initially inspired Konzak to undertake the creation of the larger one.

Konzak has written an account of the building of the Puget Sound Wind Harp which appeared in three installments in the **Folk Harp Journal** numbers 47, 48 and 49 (31 West Canyon Perdido, Santa Barbara CA, 93101; $3/copy). He now has his sights set on building more and larger harps in some more accessible public places. His current designs are done in steel, but retain the characteristic form of the traditional harp.

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OTHER WIND HARPS

Aolean harps, usually in the form of moderately-sized zithers designed to be placed on a window sill to respond to the passing breeze, have been known for centuries. More recently a number of people in the United States have built larger wind-played stringed instruments. In appearance many of these do not resemble conventional harps at all, beyond the fact that they possess strings. Some of the most prominent work in this area has been that of Bill and Mary Buchen, discussed in the "Sound Wave Festival" article in **Experimental Musical Instruments #2**, and that of Doug Hollis, with his Water-walker at the Walker Art Center in Minneapolis and other outdoor string pieces at the Exploratorium in San Francisco and elsewhere. Among the giant harps that actually look like harps (and it is, after all, a lovely form with lovely associations), the most famous, the most beloved, perhaps most tragic, was the Vermont Wind Harp. It was built at Chelsea, Vermont by Ward McCain in 1969. It lasted until about 1972, when it succumbed to weather and vandals. A history of aeolean harps and information on several more wind harps appear in **Musicworks 30: Sound Constructions** (1087 Queen St. West, 4th Floor, Toronto, Cananda, M6J 1H3).

INSTRUMENTS

GLENN BRANCA AND THE THIRD BRIDGE

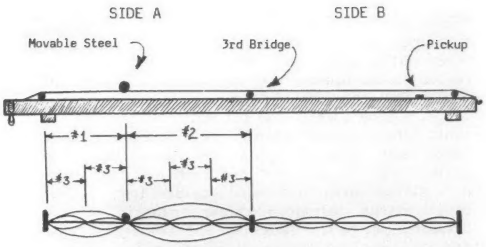
New York composer Glenn Branca has been receiving a lot of attention lately for his self-styled symphonies for electric guitars and new instruments using guitar pickups. One of Branca's instruments is the harmonics guitar. It also is a steel-strings-plus-pickup instrument, but with a very clever electro-acoustic twist. The harmonics guitar does not figure in Branca's well-known works, but it is the subject of this article.

Branca's compositions use a scale determined by the harmonic series extended through seven octaves. Along with conventional guitars, he uses keyboard instruments with electric guitar strings tuned so that their fundamentals duplicate the pitches of the harmonic series. This is one of Branca's trademarks: he uses the series for scale material, but uses strings vibrating in the fundamental, not singling out upper partials, in performing material based on these scales. In the course of his explorations, however, Branca devised a new and remarkably effective system for isolating string partials. The harmonics guitar uses this system. The technique makes for an instrument with a sound all its own -- striking and seemingly esoteric, but not so idiosyncratic as to be terribly limited in its applications. Here is how it works:

The instrument has several strings mounted on a board of four feet or so. Branca uses a regular two by four. No special sound board or resonating chamber is called for, since it uses an electric guitar pickup. The strings stretch over a bridge at each end. A third bridge is placed mid-string, as on a koto or hammer dulcimer. In this case, though, the third bridge must be located at exactly at the midpoint, creating two equal half-strings on the two sides (see the diagram). The pickup is located under the string on the right side of the diagram, labeled side B. The player plays only the half-string on the left side, labeled side A, using a bottleneck or steel, Hawaiian guitar style.

Imagine plucking this half-string with the steel touching it somewhere. The fundamental note for the full half-string will not sound of course, because the steel prevents it from vibrating freely. The lengths of string on either side of the steel, L1 and L2 in the diagram, will both be excited. The sound will be almost inaudible though, since there is no resonator, and the pickup is not in a position to respond to these portions of the string. Except in special cases their vibrations will not be transmitted across the middle bridge to side B, because their frequency will not correspond to that of the open half-string there, eliminating the possibility of sympathetic vibration.

So far we seem to have a silent musical instrument. But there remains another set of vibrations that will be excited when the string is



plucked. While the steel prevents the fundamental of the half-string from vibrating, it will not stop any partial of the half-string having a node at the point where the steel touches the string. This is a familiar phenomenon, corresponding to the most common means of obtaining harmonics on most stringed instruments (see the box opposite). On the harmonics guitar, due again to the lack of a resonator, these partials will be virtually silent on side A. But since the two half-strings right and left of the middle bridge are equal, there will be corresponding partials in the half-string on side B. With this agreement, a sympathetic vibration on side B will be possible for those partials only. The half-string on side B will accordingly respond sympathetically to those partials excited on side A, and the vibration will have been transmitted across the bridge from side A to side B. There it will be sensed by the pickup, converted to electrical impulses and sent to an amplifier, and, finally, we will have sound.

In the example represented in the diagram above, the steel is placed at a point 3/5 of the way along the half-string on side A, dividing the half-string into two segments equal to 2/5 and 3/5 of its length. None of the natural modes of vibration of the half-string on the other side correspond to these lengths, so the side B half-string will not respond to their vibrations. But placing the steel at that point also allows for the vibration of the entire half-string on side A in five smaller loops equal to 1/5 of its length. This vibration is, of course, the fifth harmonic. Since the two half strings are identical, the naturally occurring fifth harmonic on side B will have the same frequency, so side B will readily pick up the vibration and communicate it to the pickup. The steel at the 3/5 point will also allow for the multiples of the fifth harmonic -- 1/10 of the string length, 1/15, and so forth -- and these too will find corresponding resonances and be transmitted across the bridge to side B.

Thus the third-bridge-and-pickup combination filters out all vibrations but those partials of the open half-string that are selected by the placement of the steel. It transmits these partials -- especially the very high ones -- immeasurably more effectively than the methods used for isolating string harmonics on conventional stringed instruments. It makes for a very clear sound, free of the noise of the pick or fingers on the strings. As one plays, previously sounded notes continue to ring within the string on side B as new tones are sounded, creating an echoey, layered sound. Rainbows and showers of changing harmonics, many of them so high as to be difficult to identify as specific pitches, come forth from the harmonics guitar effortlessly.

The number of partials theoretically available on a string is infinite, and the number available within the hearing range is quite large. As a result, for practical purposes there is very nearly a continuum of nodes for possible partials along the strings of the harmonics guitar. The harmonic series becomes increasingly dense (more pitches per octave) as one ascends in pitch, so that a great many of the partials that the instrument sounds so readily are very, very high, crowded near the top of the audible range. Plucking the string and moving the slide a short distance generates a bewildering array of these tones.

On the other hand, one can learn to select specific pitches deliberately. Branca calibrates the would-be fingerboard under the strings with markers indicating the locations of the nodes for the different partials in a manner reminiscent of the guidelines on the neck of a Hawaiian guitar, some of Ivor Darreg's electric-guitar-like instruments, or Pierre-Jean Croset's Lyra, (discussed in last June's issue of this newsletter). The harmonics guitar easily generates harmonics several octaves above the fundamental where the distance between pitches in the series becomes very small, making scales available that are more than complete by conventional standards. And, of course, for those who are uncomfortable with tempered scales, the pitches thus obtained (assuming a good, uniform string) represent the mathematically ideal relationships of the harmonic series.

CONVENTIONAL STRING HARMONICS TECHNIQUE

In conventional string instrument technique, the player produces harmonics by lightly touching the string at one of the nodal points for the desired harmonic and plucking with the other hand. The finger resting on the string prevents the vibration of the fundamental and partials not having a node at that point. But partials having a node there will vibrate freely, since the nodal point itself need not move except to pivot while the portions of string on either side of it oscillate. Thus the player can, by the location of his finger, deliberately select certain harmonics while eliminating the fundamental and other harmonics.

Branca's harmonics guitar takes this principle a step further in a way that allows for a cleaner sound, a much broader array of harmonics, greater responsiveness and ease of playing, and a variety of new techniques and effects.

INSTRUMENTS

MEET MOTHRA

Tom Nunn

Here is the first of two articles by Tom Nunn discussing his instruments. This one describes some members of the **electroacoustic percussion boards** family of instruments, followed by a brief piece on new instruments in free improvisation. In the next issue he will be writing about the instrument family he calls **space plates.**

"Mothra" is a recent design in that type of instrument I call **electroacoustic percussion boards.** Mothra is a three-legged table variety. Its progenitor, the "Earwarg," is a four-legged table variety. These table-like percussion boards consist of a 3/4" birch plywood sheet with various devices attached which are played in a number of ways with different implements. The board is amplified using two contact microphones (pickups) attached to the underside.

Mothra is seven feet wide and two feet deep at the center point (see photo). Its devices include 1/4 inch threaded steel rods, 1/8 inch bronze rods, nails, combs, springs, glass beaker top ("beaker squeaker"), and surfaces (self adhesive sidewalk safety surfaces). To play these devices, I use a number of implements and basic techniques. Implements include fingers, small wooden sticks, guitar picks, small threaded rods, rubber rods and mallets, small plastic bows with nylon or monofiliment line, and combs. The basic playing techniques are: striking, strumming, plucking, scraping, rubbing and bowing.

By multiplying the number of devices times the number of techniques times the number of different implements, then subtracting invalid combinations, we get a good idea of the potential of the instrument. These combinations are themselves very basic, and within any given combination there can be much variety and depth of technique. An example: sticks scraping rods. There are long sticks, short sticks, aluminum sticks, plastic sticks. Scraping can be rhythmically and temporally varied. Placement of the stick on the rod determines one of the pitch characteristics and can be varied during the scrape; speed of the scrape determines another pitch characteristic. The length, diameter, and shape of the rod being scraped will determine a third pitch characteristic. And finally, the range of positions along the rod during the scrape will determine a fourth pitch (gliding) characteristic.

This potential for variety is the primary strength of the electroacoustic percussion boards. And since the instrument is amplified, one can extend the range of sounds even further with electronics and/or computer. Its range of sonic possibilities makes it adaptable to different styles and compatible with almost any other instrument, traditional or non-traditional.

Regarding the design of the instruments, I was recently asked what part practical necessity played versus the visual or sculptural aspect. I explained it in this way: I begin with practical necessity (e.g., the kinds of motion necessary to

TOM NUNN'S MOTHRA

make sounds with the devices, placement of devices for optimum acoustic effect), then I create an aesthetic visual design given those circumstances. My first consideration has usually been the shape of the board. Then, given that shape, I determine practically and aesthetically where to place the devices. In their visual aesthetic, my designs are usually "creature-like," with antennae, scales, wings and so forth. And often their sound reinforces this image.

The music this type of instrument can make will depend on the composer and/or player, of course. Although I have designed them with free improvisation in mind, an appropriate notation could be invented for them so that they could be "scored" in a written composition. However, that is not something I am personally interested in doing. My interests lie in improvisations, and my improvisations on these instruments center around specific devices, techniques and/or implements, or combinations thereof.

For example, I may decide that a particular improvisation (or section of an improvisation) will feature strummed nails. Such music tends to be harmonic and textural, articulating arpeggios along shifting sections of the series of nails. Another improvisation might feature striking threaded rods, working rhythmically with patterns and melodic identities. A third improvisation could evolve around scraping (anything). This could vary greatly in character from insect-like scrapings of short combs with short, quick, jagged phrasing to a rhythmic "disco" beat featuring scraped threaded rods.

And these are but three possibilities. There are over fifty workable combinations of implement/device/technique which could be used as the basis of an improvisation. Additionally, specific sounds may function as identities or "centers" around which the improvisation evolves because of their predominance harmonically, timbrally or dynamically. Whatever the compositional orientation, Mothra and other electroacoustic percussion boards offer many possibilities to be explored.

AT LAST SPRING'S SOUND WAVE FESTIVAL IN SAN FRANCISCO (See EMI #2) A FESTIVAL-GOER SITS REGALLY BEFORE TOM NUNN'S EARWARG.

INSTRUMENTS FOR IMPROVISATION

My background as a composer led me to an interest in improvisation. As a graduate student at the University of California at San Diego in 1975, I stopped writing compositions and began to explore the idea of "real time composition." I chose to begin my study at the most fundamental level: "free" improvisation with both musicians and non-musicians using found objects. This eliminated most traditional preconceptions and allowed me to listen to ideas in sound the moment they occur in the mind, without any overbearing stylistic bias. It allowed me to hear spontaneous interactive processes among players. And by listening back to tapes, I had a means for critically evaluating both the compositional and performance aspects of my improvisations.

From reading the literature, I came to realize that western musical history is full of the greatest variety of improvisatory forms and practices. Studying the various "rules" of improvisation in forms such as the Fauxbourdon revealed the compositional and practical nature of improvisation of the particular style. Though our contemporary styles are quite different sounding, the fundamental compositional and ensemble problems they faced back then are the same we face today. And so we have much to learn from our western musical heritage about "free" improvisation, oddly enough.

I did not expect, in this study of improvisation, to develop such an interest in experimental musical instruments, which grew from the found objects we used and modified. But the instruments evolved and continued to provide a musically unique pallet of sounds with which to improvise. In time, the instruments and our playing of them developed a style of their own. Working primarily with Jon Glasier and Prent Rogers, I started what became known as the ID Project (ID for Improvisational Development). We actively brought lay people into the experience of making music through Sunday jams in San Diego's Balboa Park, and various workshops for adults and children. We also developed and expanded our instrumentation and our performance abilities, eventually establishing a group we called Confluence. Since moving to the Bay Area in 1977, I have continued developing those ideas which began with our efforts in San Diego several years ago.

Perhaps the most rewarding aspect of designing and building experimental musical instruments is that each one teaches something, suggests further evolution, and allows our imagination to discover new ways of expressing itself. And I believe such instruments are ideally suited to the compositional art of "free" improvisation.

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The Wavicle Board may be heard on the 1980 cassette tape Earwig, available from the address given in the "Recordings" section of this issue. For recordings of Nunn's more recent instruments, including the Mothra, contact Tom Nunn at 3016 25th St, San Francisco, CA, 94110.

SOME THOUGHTS ON SOUND ART EXHIBITS

By Peter William Brown

It was my privilege to organize, or perhaps orchestrate, one of the largest and most inclusive "sound shows" that has ever been presented in the Bay Area. This was "All Ears: a sound investment," which took place at Civic Arts Gallery in Walnut Creek, California during the summer of 1984. During my research for the exhibit I took note of the ways such shows have been handled at other times and places. Sound exhibits are terribly problematic and it was an enormous help to consider other people's solutions before I set out on my own. It seems appropriate that I share my findings and solutions with all who might have similar problems and in this way encourage more sound shows to be produced. For the fact is that though this type of exhibition is troublesome, it can be done successfully, and when they are well done they are extremely popular.

THE SOUNDS OF SILENCE -- THE COP-OUT APPROACH

Believe it or not most of the exhibits of musical instruments are silent. Viewers are shown the individual pieces as if they were works of art, which they are, but in a completely hands-off silent exhibit format. If there are sounds, they are taped or perhaps performed in series during the run of the exhibition. There are of course times when this is appropriate and necessary, for instance in an exhibit dealing with historical instruments. Nonetheless, such an approach hardly does justice to the potential exhibit. A taped walkman tour of such a show is an obvious solution to the problem, but this requires a serious allocation of funds to facilitate. And obviously, canned music can not compare with live sound.

THE MANY-ROOMED APPROACH

Where space and budget allow, an exhibition space can be divided into small rooms each housing a single sound-producing piece. With judicious use of baffles and insulation a fairly good isolation of sounds is possible. The drawback is that this kind of installation is very expensive, and limits the number of pieces that can be presented. Also, there are problems with security and traffic flow. This is a purist's approach and it has been done well, but the costs make it out of reach to most public exhibit facilities. The dilemma is clear -- for while this may be the "best" solution to the sound show problem, using it means that this type of show will be rare due to the costs.

TOKENISM

As more and more sculpture exhibits are produced an attitude takes form that says, "well, we must include at least one sound sculpture." Likewise we also do one light sculpture, and one kinetic piece. The results of such aesthetic tokenism are to trivialize the minority. The isolated representative of the genre is present but its impact is undermined.

THE MUSIC BOX APPROACH

This is the approach that I settled on after considering all the possibilities for the All Ears show. The exhibit facility at Civic Arts Gallery includes 5000 square feet. 3500 are downstairs, the remainder on a mezzanine which looks down into the main gallery. All of this sits under a forty-feet high vaulted ceiling. In short I had plenty of space but little chance of isolating sounds. I began to think of the place as a giant music box, where the visitors were the control mechanism. The notion proved to be a successful solution.

Forty of the pieces in the show were "hands-on." Visitors were invited to play them. Surprisingly none of these were damaged during a ten week run. The hardest part was to orchestrate the various displays in a way that allowed one to hear a specific piece while operating it, but also being able to hear all the other displays in concert. The acoustic properties of the room made this possible.

Several of the exhibits were continuous. These created an ambient background noise level. One was a fountain which gurgled and splashed, another was a set of motorized chimes which clanged sweetly and randomly. Another set of displays was passively activated as viewers walked by (several had heat sensors; others were set off by pressure switches). These were icebreakers; they got people involved and participating.

The balance of the hands-on pieces were there

A FEW PIECES FROM THE ALL EARS EXHIBIT. Also appearing were works by Karen Wolff, Richard Lerman, Sharon Rowell, Bruce Fier, Cris Forster, Jim Pomeroy and Richard Waters, among many others.

to stroke, bow, hit or strum. Most were New Music items but I did include a modified electric guitar and a baby grand piano.

The show also included hands-off displays of antique instruments, paintings and sculpture. The sculptures were both sound-producing and silent.

To be sure, opening night was a fiasco. The sound was too much when everything was going at once. But after that on any typical gallery day the music box approach worked exceedingly well.

Some things to consider in mounting this kind of show: volume controls, where feasible, are a big help. Intermittence should be used to keep variations going. Create a sensitive dispersal of objects -- keep the cymbals away from the harps. And be courageous, for it is far better to fail outright than to let the problems keep you from attempting things in the first place. Cheap ear plugs can be provided for all.

It behooves all of us who are interested in sound to lobby and insist that more museums and galleries present sound exhibits. It can be done and it does not have to be expensive. I would be most happy to share ideas about this topic with anyone who faces the problem. I can be reached at (415) 943-5866. **All Ears** was well documented in video tape, slides and audio tape. I want to hear more exhibits!

ORGANIZATIONS & PERIODICALS

THE GUILD OF AMERICAN LUTHIERS

> "The Guild of American Luthiers is a non-profit, tax-exempt organization formed in 1972, and is designed to function as an information sharing system. Our purpose is to advance the state of the art and science of lutherie through a free exchange of information.
>
> **American Lutherie** is a magazine unique in the world, in that it contains letters, reviews, news, plans, technical information, pictures, interviews, fact, opinion and advertisement, all of specific interest to the maker and repairman of stringed instruments. We strive to represent in our pages every type and period of stringed instrument."

That is how the Guild of American Luthiers describes itself on the inside cover of its publication, **American Lutherie**. It is an accurate enough description, except that the formal tone belies the very friendly nature of the organization.

The beautifully designed and printed quarterly **American Lutherie** is the centerpiece of the group's activities. It runs articles on individual makers, stringed instrument acoustics, the business of luthiery and its tribulations, tools and materials, goings-on within the guild, and similar topics. A sampling of typical article titles from the most recent issue: "More on Template Routing," "1984 Lutherie Biz Panel," "Wood's Appearance," "Radiation from Lower Guitar Modes," "The Red (Spruce) Scare," "Calculating String Tension and Gauges," and "No, It's a Craft." The magazine also prints a lively column of letters from members, which, by some tacit consensus, are usually written in an engaging "Hi, how are ya?" style.

The title "American Luthierie" is new. Prior to this year the publication appeared in a smaller format and was called **The Guild of American Luthiers Quarterly**. Along with each issue of the old Quarterly the Guild sent its members several separate printed pieces called Data Sheets. These were typed sheets of specific technical information, assembled by individual members of the Guild to be distributed for the benefit of other members. They were fascinating for their peculiar mix of subject matter, with titles like "Bandsaw Tricks Two" (which sounds like a newspaper headline), "Cyonoacrylate, Spot Spraying, etc." and "Gruhn's Neck Removal." A steady stream of these sheets were produced between 1972 and the time of Quarterly's format change in 1984 -- over two hundred all told, constituting an utterly unique library with contents at the same time practical and esoteric. As you might expect, many of the Data Sheets are potentially interesting to new instruments people. I myself made a point of obtaining, among others, "Strings for Ethnic Instruments," "Calculating String Tension," and "Small Bow for Psalteries and Dulcimers." Some of the earlier Data Sheets are now out of print, but most remain available through the Guild, either individually or in bound sets.

The Guild of American Luthiers also has a biennial convention at which members display their work, gather for lectures and concerts, and generally mingle. I only know about these conventions what their publication reports. Their publication reports that they are a blast. The next one is scheduled for 1986 in Tacoma, Washington, the Guild's home base.

Membership in the Guild of American Luthiers now stands at something over 1700. A large percentage of these are guitar people, and this is reflected in the Guild's publications and activities. Perhaps this is inevitable -- there just are a lot of guitarists in the world. But it might be valuable to see the Guild doing more to fulfill its promise of "every type and period of stringed instrument."

Membership in the Guild of American Luthiers is $25 per year and entitles one to four issues of **American Lutherie**, free or reduced-price ads, discounts on instrument plans, and a membership certificate. A list of titles and prices is available from the Guild for ordering back issues of the magazine and reprints of the Data Sheets. The address is:

> The Guild of American Luthiers
> 8222 South Park Ave
> Tacoma, WA 98408
> (208) 472-7853

BOOKS

SONIC ART
Edited and with a foreword by Marlin Halverson

Catalog of the Sonic Art Exhibition at the Art Gallery, California State College, San Bernardino, 1982. Contributors include Chris Banta, Bob Bates, Bill & Mary Buchen, Ivor Darreg, Bruce Fier, Cris Forster, Arthur Frick, John Gibbon, Jonathan Glasier, Marlin Halverson, Jim Hobart, Doug Hollis, Skip La Plante, Philip Loarie, Tom Nunn, Jim Pomeroy, Susan Rawcliffe, Prent Rodgers, Stephen Clay Smeed, and Robert Wilhite.

Available (but in limited supply) for $3.00 from the Art Department, California State University San Bernardino, 5500 University Parkway, San Bernardino, CA 92407-2397.

In a recent letter to **Experimental Musical Instruments** Tony Pizzo said, "Speaking of exhibition catalogs...I bet that EMI would be a great channel for them -- you can't get them through bookstores, and lots go to waste which could be mailed to interested parties who can't fly across the country for a show. They're also highly concentrated up-to-the-minute ephemera we all can use for input."

Tony is referring to the fact that in recent years there have been an increasing number of exhibitions of contemporary sound sculpture. Some of these -- perhaps half -- find it in their budget to put together a catalog presenting the words and work of the artists in the show. Catalogues also sometimes appear in connection with new music festivals which include some sound installations and innovative instruments. Because they usually are artists themselves, the people who put these catalogs together try hard to represent well their fellow artists and their work. They often arrange for the artists and builders themselves to write and select photographs. They have the desire and the eye to create a visually striking publication, while the funding for the shows frequently allows for paper and printing of high enough quality to create a handsome finished product.

Show catalogs are normally distributed through the exhibits or festivals themselves. But it is difficult to predict what the demand for them will ultimately be, and the rule of thumb for this job is generally to print more than one expects to need. Accordingly, there usually are plenty produced and some left over when the exhibit closes. Sometimes a promotional effort is made to sell the leftovers; more often they end up on a shelf someplace. In either case they often are available even after the show closes, if one knows who to ask or where to write.

Show catalogs are a peculiar sort of publication with a peculiar value in a peculiar field. Not a great deal is written on the subject of new sound sources. Anyway, in such a lively and changing field as this it is difficult to capture the scene in some definitive way and place it between hard covers. A lot of what goes on never is documented. But sound sculpture exhibitions can generate the means to put in print what otherwise would never have been printed; their catalogs capture a moment that otherwise would have simply been gone. They make up an important part of the precious little literature about new instruments.

So **Experimental Musical Instruments** will follow Tony's suggestion to serve as a channel for the catalogs, at least in this indirect way: we will be letting people know what catalogs are available by intermittently devoting our Books section to them, and including in those write-ups the address and price information for ordering. We start this month with the very fine catalogue from the **Sonic Art** exhibit, assembled by the show's curator, Marlin Halverson.

Sonic Art took place at the campus art galleries of California State College San Bernardino and San Bernardino Valley College in February and March of 1982. Halverson was a senior at CSU San Bernardino at the time, pursuing his work with sound from a sculptor's perspective. The chairman of the Art Department suggested that he develop an exhibit of sound-producing art for the college gallery, and Halverson took the suggestion seriously. He managed to connect with a goodly number of builders -- not an easy job given the reclusive and independent nature of many of them -- and arranged for the work of twenty varied and adventuresome makers to appear in the show (their names are listed above).

Each of the twenty builders wrote a half page or so for the catalog Halverson put together with the help of fellow art students. A photograph appears with each piece. Some of the writings are straight-forward descriptions of the artists' work; others are full of historical or philosophical meanderings. In some of the most interesting ones the artists attempt to convey some of the motivation, the feeling or the reasoning behind their work. The photos, submitted by the artists themselves, vary in both style and quality, but most are interesting, effective and clear, aided by the attractive, spacious layout of the catalog as a whole.

In addition to the submissions of the twenty artists, there are three introductory pieces. Marlin Halverson's graciously-written foreword describes the making of and the philosophy behind the exhibition, crediting previous exhibitions that inspired him and the many people that contributed to the current one. Bob Bates, builder of the Converter and a contributor to the show, follows with "Sound/Art/Seeing", an essay concerned with the role of artists as "actualizers." Next comes "Sonic Art", written by Jonathan Glasier, editor of Interval Magazine and a member of EMI's editorial board, and also a contributor to the show. It gives some history on sound-making art, starting with the noise orchestras of Italian Futurists Russolo and Marinetti, and leading to an overview of the work of the people in the exhibit.

The result is a handsome twenty-eight page booklet, filled with material on contemporary

sound sculpture that would be difficult to find elsewhere. It is striking that Halverson, still in college and lacking the prestige and connections that are so helpful in making things happen, succeeded in putting together a show and publication as polished as this. It's definitely one of the fine examples of the "highly-concentrated ephemera" that Tony Pizzo referred to in his letter.

RECORDINGS

ALTERNATING CURRENTS
Chris Brown
Cassette tape available for $8.00
from 1951 Oak Street #4,
San Francisco, CA 94117.

Chris Brown started out as a pianist. He continues to play new music on the piano, but in recent years he has designed several new instruments, some with keyboard and some without, and incorporated them into his compositions and performances. This tape contains four of his recent pieces. Brown recorded the material in 1984 with the help of a few friends, fine musicians all, at the Center for Contemporary Music in Oakland.

The centerpiece of the collection is the title piece, "Alternating Currents." It was originally commissioned by Kent Nagano, director of the Berkeley Symphony Orchestra. The Berkeley Symphony premiered it in 1984. Brown spent over a year composing it and scoring it for full orchestra in preparation for that event.

On the tape we hear "Alternating Currents" rescored for a small ensemble. William Wynant plays vibraphone and a lot of other percussion, and Toyoji Tomita plays bass trombone. Brown is on three of his own invented instruments, described below, and a synthesizer programmed for orchestral sounds.

What the liner notes for the tape call "percussion piano" is the instrument Brown usually calls the Gazamba. It is an electromechanical instrument incorporating an everything-but-the-kitchen-sink percussion ensemble, activated by a keyboard. Gamelan sounds, prepared piano sounds, Chinese Opera sounds and not-easily-labeled sounds tumble out of this thing, one sound per key.

What the liner notes call "amplified rods" is more familiarly known as the Wing. A number of brazing rods are welded in an upright position on an oblong sheet metal resonator, about four feet wide and a foot or so deep. The sheet metal rests at its midpoint, balanced and drooping a bit on either side, on a balloon snugly held upright in a bucket-like container. The balloon mounting system allows a maximum of free resonance to the entire assembly. The rods are played with a bow. They are tuned (slowly and painstakingly) to a chromatic scale.

This version of "Alternating Currents" also uses an electronic signal processing unit. In an endeavor that he regards as a regular part of his instrument building activities, Brown has been evolving his own processor to modify signals originating in natural acoustic sounds. Of course, there are any number of standardized signal processing units available; Brown's instrument, by contrast, is a personalized affair. It uses several special circuits that he has either devised or selected from other sources, set in a configuration designed for manipulation in performance like a conventional instrument.

To return to the music itself: Much of "Alternating Currents" has the freely forward-moving feel of an improvisation. This is an intentional deception. It was written out, in conventional music notation, down to the last pitch and duration. The principles by which the piece is organized are elaborate enough to warrant Brown's having been asked to give lectures outlining his procedures.

The key to the underlying structure is a Fibonacci series. Fibonacci series are numeric series in which each subsequent number is the sum of the preceding two. The finite series which Brown uses is 2:3:5:8:13:21:34. Each movement of "Alternating Currents" uses the series differently, but it manifests itself most prominently in the duration of musical sections within the piece.

For example, in the first movement the series appears in reverse order. It is manifest in time periods marked by harmonic changes. The periods are measured in units of about three seconds, defined relative to the definite pulse that prevails in the movement. An opening segment revolves around a single tonality for the duration of thirty-four time units; then shifts to another for twenty-one time units; then another for thirteen, and so on. The cumulative effect is an accelerating harmonic motion, culminating in brief durations and fast changes at the end of the movement.

That first movement's sixteenth note pulse and increasing harmonic density lead abruptly to a single long, low tone which joins the first movement to the second. In a captivating contrast, the second has skipping, stumbling, irregular rhythms in the percussion, always there but unpredictable. Over this the trombone plays awkward-graceful legato melodic figures, very welcome to the ear. Again a single sustained low tone forms the bridge to the following movement.

The third and last movement is one of simultaneous contrasting textures and gradual evolutions. After a spaceous and thoughtful beginning, some instruments begin to ritard as others become faster and more frantic. The percussion in time comes to dominate, and as its increasing density seems to resolve into a sort of continuous roll, the music miraculously acquires a new level of calm. The wing reappears with a feeling of glowing stillness, and "Alternating Currents" glides to a quiet close.

Three more pieces appear on the Alternating Currents tape. "Conjunction for JKP" is written for acoustic piano and Wing, with some signal processing. Spacious and lucid, it achieves a wonderful clarity of structure without leaning on excessive simplicity or bowing to the current vogue for systematic ostinato. "Ready" is a group improvisation for Brown's piano, vibes and per-

cussion played by William Wynant, and saxophone played by Larry Ochs and recorded deliberately (I think) with a lot of key and pad and wind noise. It too is spacious and understated, the group keeping a strong ear to texture throughout, with a lot of pointilistic single notes and brief, staccato flurries. The last piece is Post-Mortem, for saxophones, percussion, piano, Wing, Gazamba and signal processor. It begins as a thoughtful duet between sopranino sax and Wing, is forcibly appropriated by the other instruments, and returns at the end to the duet.

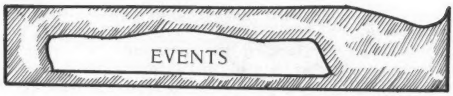
OTHER WORK BY CHRIS BROWN

Earwig is another cassette tape Chris Brown made with Tom Nunn in 1981. It includes an insert with drawings of the instruments used, including the Wing and the Gazamba, as well as some of Nunn's instruments. It is still available for $8.00 from the address given at the top of this article. Along with the tape an eight-minute 16 mm film also called **Earwig** was made. It can be rented from Canyon Cinema Film Co-op in San Francisco.

Brown's music will be part of **Cold Blue Records Anthology #3**, soon to be out and probably to be available through New Music Distribution Service (500 Broadway, New York, NY 10012).

Another of his pieces will be performed by William Wynant as part of this year's New Music America festival at Schoenberg Hall in Los Angeles on November 11th.

Brown is treasurer of the performance organization Ubu, which presents a quarterly series of concerts in San Francisco. This month (October) they will be hosting concerts of live electronic music under the title Advance Arts.



NEW DEPARTURES/MUSIC

The Maitreya Institute of San Francisco sponsored a series of concerts over the Labor Day weekend at Theater Artaud in San Francisco. They presented a mixed bag of performers and composers, including text-sound composer Charles Amerkhanian, a capella jazz vocalist Bobby McFerrin, contemporary folk musicians Kate Wolf and Buddy Red Bow... and two events with new instruments: a performance by the group Totem, and one featuring the Semi-Civilized Tree, by Nazim Ozel.

TOTEM

Totem is Richard Waters' group. Waters is the inventor of the Waterphone, a bowed rod instrument with water held in a metal bowl which serves as a resonator. Movement of the water causes timbral shifts and pitch bending, with exotic and very beautiful effect. In performance Waters uses waterphones of several different sizes, as well as some of his other instruments. In this concert he included a set of springs mounted on a resonator box and played with scrapers and beaters, and a rack of metal percussion. In addition to Waters playing his own instruments, Totem includes Mel Graves on stand up bass, Jon English on trombone, Tom Dondelinger on percussion, and Fred Curchak with extended vocals and dramatic and visual effects.

Totem's performance included five or six pieces, beginning with shadow play created by Curchak. A scrim was set up with the musicians behind. As the remainder of the band played, Curchak recited a poem by Wiliam Blake while, by means of a flashlight and his own hands and body, he created some truly amazing shadow works on the scrim.

For another of the pieces, all the musicians save Waters deserted the stage. As Waters, alone before the audience, began to play, the sounds of the other musicians emerged from the dark to accompany him; they had silently stationed themselves at various points around the theater. The piece was made up of the kind of thoughtful, sustained sounds, developed primarily along timbral lines, that suit the waterphones so well. The performance was rounded out by some pieces in a modal jazz vein, and one highly rhythmic composition.

NAZIM OZEL

Nazim Ozel is a classically trained Turkish musician, and a master of the Ney flute. Over the last few years he has been developing an instrument he calls the Semi-Civilized Tree. It is an ornately twisted oak branch -- or, rather, a larger branch leading to several lesser branches -- with more than four hundred strings attached in every possible configuration. Due to the shape of the branch, most of the strings are in clustered groups ranging from five or ten strings to forty

or fifty. Different clusters are tuned according to different intonational systems. Some are set to Turkish scales.

The instrument by itself is too quiet for performance in all but the smallest rooms. But while the branch does not transmit much sound energy to the surrounding air, it does efficiently transmit vibrations throughout itself. Ozel takes advantage of this by placing a transducer on the wood at a central point. It picks up vibrations from all of the strings with surprising uniformity.

Ozel sounds the strings by every means available to him: among other things, he bows them, strikes them with beaters of several different sizes, and plucks them with fingers and picks. He also manipulates the pitch and timbre of the strings he plays, varying their tension and vibrating length and muffing them in any number of ways. In one of his most prominent techniques he takes advantage of the flexibility of the wood by bending the branches to alter the tension on the string being played, creating vibratos and glides.

Ozel's performance was a single, continuous piece of music-making lasting a little under an hour. With the several types of string used on the instrument, variations in the thickness and rigidity of branches supporting those strings, and the widely varying lengths and tensions on them, the instrument naturally produces a broad pallet of timbres. Add to this Ozel's multitudinous methods of sounding the strings, and one begins to see that an hour of the Semi-Civilized Tree will take the listener through an ever-changing landscape. The visual beauty of the instrument itself, the branch with all its bends and twists and the four hundred strings glittering with every movement, is part of that landscape. The form of the instrument, with the strings arranged on all sides and oriented in all directions, creates its own choreography for the player, a choreography seemingly well suited to Ozel's natural movements. Plucking strings here, over there, underneath and up on top, he moves swiftly and silently like a cat. Moving the bow from one side to the other, he recalls nothing so much as the practitioner of some refined and stylized tradition of swordsmanship. The sight and sound together make for an effective performance.

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COMING EVENTS

A couple of noteworthy gatherings will be taking place in the Los Angeles area in November.

The first is the New Music America 1985 festival, taking place at various venues around the city from October 31 through November 11. A number of people who have worked with new instruments and sound sculpture will be represented.

The second is the 1985 Percussive Arts Society International Convention, taking place at the Sheraton Universal and Sheraton Premiere hotels in Universal City, November 14-17. Among the events planned are a display of instruments built by Chris Banta (maker of extended marimbas and lots of other things), another display presenting Emil Richards' extraordinary instrument collection, and a concert by the Harry Partch Ensemble using Partch's original instruments, led by Danlee Mitchell, curator of the Partch collection.

Listed below are selected articles of potential interest to readers of **Experimental Musical Instruments** which have appeared elsewhere in recent months. We encourage readers to clip or copy noteworthy articles and send them to EMI for mention in this space.

Interval Vol IV #4 (P.O. Box 8027, San Diego, CA 92102; $18/year, back issues $3 apiece).

The long awaited latest issue of **Interval** appeared in August, and contains several interesting articles:

"A SELECTIVE LIST OF SOURCE MATERIALS ON ALTERNATIVE TUNING SYSTEMS IN AMERICAN MUSIC" by Douglas Leedy is a bibliography of 100 entries, including both books and articles. It was compiled in connection with an article on tuning systems which will appear in **The New Grove Dictionary of American Music**, scheduled to be published in the spring of 1986.

"PIERRE-JEAN CROSET AND HIS LYRA" by Jonathan Glasier is an interview with the French composer and instrument builder whose work appeared in **Experimental Musical Instruments** Vol. I #1. Croset talks about his multi-cultural perspective on instrument building, performance practice, and the development of a new musical language.

"THE PENTAPHONE -- UNFOLDING FIVES" is Jonathan Glasier's description of the Pentaphone, the resonated bar instrument he built at the Exploratorium in San Francisco (also discussed in **Experimental Musical Instruments** Vol I #1).

"THEREMIN -- THE FIRST ANALOG SYNTHESIZER" by Ivor Darreg discusses this early 20th century electronic instrument. The article describes its workings, gives lots of history, and speculates about its contemporary relevance, all in Darreg's peculiar and appealing mix of formal and informal language. He's right to re-focus our attention on this instrument -- there has been nothing remotely like it before or since.

"A PNEUMATIC HARP" by Dick Hoar, in **Folk Harp Journal** #50, September 1985 (31 West Canon Perdido, Santa Barbara, CA 93101; $3.00/copy).

Hoar's article describes a newly-devised pneumatic system for operating semitone stops on a folk harp, providing a quick, silent system for changing keys.

"STRING TENSION AND GAUGES" by Graham McDonald, in **American Luthierie** #2, June 1985 (8222 South Park Ave., Tacoma, WA 98408).

McDonald's article provides formulas and graphs relating the mass of steel strings to their gauge. This allows one to arrive at an appropriate gauge for a given application using formulas relating length, tension, frequency and mass.

"SKIN HEADING ETHNIC DRUMS, ETC." by Topher Gayle, in **American Luthierie** #2, June 1985 (address given above).

This article gives procedures for attaching goat and calfskin drumheads by gluing. It appears in **American Luthierie** primarily for its interest to makers of traditional banjos, but the author is a maker of dumbegs.

"A NEW APPROACH TO THE CLASSIFICATION OF SOUND-PRODUCING INSTRUMENTS" by Rene T. Lysloff and Jim Matson, in **Ethnomusicology**, Vol 29 #2, Spring/Summer 1985 (P.O. Box 2984, Ann Arbor, MI 48106).The most recent attempt to create a coherent taxonomy for the musical instruments of the world.

The next issue of **High Performance** (240 South Broadway, 5th Floor, Los Angeles, CA 90012, $5.00/copy), designated as Issue 30, will double as a catalog for the New Music America 1985 festival.

Experimental Musical Instruments
P.O. Box 423
Point Reyes Station, CA 94956

To: